

Original Article

Frequency and Patterns of Traumatic Dental Injuries Reported at Islamabad Dental Hospital: A Retrospective Study

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ABSTRACT

Background: Traumatic dental injuries (TDIs) are increasingly becoming a public health concern, with a significant number of cases presenting to emergency departments worldwide. They affect a diverse age range, particularly children and adolescents, and are influenced by various etiological factors such as falls, sports injuries, and road traffic accidents. Previous studies have indicated a gender predisposition, with males more frequently affected, and a pattern of injury that varies by region.

Objective: This study aimed to investigate the frequency and patterns of TDIs treated at the Department of Operative Dentistry, Islamabad Dental Hospital, and to analyze the management strategies employed.

Methods: A retrospective cross-sectional analysis was conducted, examining patient records from 2015 to 2022. Approval was obtained from the institutional review board, aligning with the Declaration of Helsinki. Data from complete TDIs forms were extracted, detailing the type of injury, timing, and treatment administered. Statistical analysis was performed using SPSS v.23, with chi-square tests applied to examine the association between the type of trauma and demographic variables.

Results: A total of 88 teeth with TDIs were recorded. The most common injuries were complicated crown fractures (28.4%) and root fractures (17.0%), with splinting (31.8%) and root canal treatments (29.5%) being the most frequent management procedures. Male patients were predominantly affected. Notably, adult cases surpassed those of children and adolescents, contrary to global trends.

Conclusion: TDIs constitute a significant portion of dental emergency cases, with specific patterns and treatments that vary by demographics. Immediate and appropriate management, guided by current guidelines, is essential. Efforts should focus on increasing awareness and providing adequate training to healthcare providers for timely and effective treatment of TDIs.

Keywords: Traumatic Dental Injuries, Dental Trauma, Operative Dentistry, Endodontics, Emergency Dental Care, Retrospective Study, Epidemiology of TDIs, Dental Injury Management, Islamabad Dental Hospital.

INTRODUCTION

Traumatic dental injuries (TDIs) are significant concerns within dental emergency care, affecting a substantial proportion of both permanent and primary teeth across various age groups. With an estimated global prevalence of 22.7%, TDIs are expected to exceed the rates of dental caries and periodontal diseases in the near future (1-3, 5, 6). These injuries predominantly occur during childhood and adolescence, influenced by a variety of etiological factors such as environmental conditions, individual behaviors, and iatrogenic causes. Young children are more likely to experience TDIs in settings like kindergartens, parks, and homes, while young adults often sustain injuries during sports, road traffic accidents, or violent incidents at home (9, 10). The consequences of these injuries are not only costly but can also have a profound impact on an individual's self-confidence and overall health, making prompt identification, management, and treatment crucial to mitigating their long-term effects (5, 8, 10-13).

The spectrum of TDIs ranges from uncomplicated to complicated crown fractures, with the former being more common. Clinical and radiographic evaluations are essential for accurately diagnosing the type of injury, which may lead to various sequelae such as tooth discoloration, root resorption, ankylosis, pulpal necrosis, and periapical lesions. Studies have shown that the nature of the trauma and the age at which it occurs are closely associated with these outcomes (3, 13, 15-17). Therefore, timely and appropriate treatment

is imperative, especially in deciduous dentition, where delays can adversely affect permanent dentition (6, 18). The implementation of immediate management strategies is vital for preventing bacterial invasion and preserving pulp vitality (19).

Moreover, the improvement in educational and practical training has enhanced the ability of healthcare providers and students to manage TDIs effectively. Implementing safety protocols in high-risk areas is recommended to reduce the incidence of these injuries (20, 21). The aim of this retrospective study at the Department of Operative Dentistry, Islamabad Dental Hospital, was to determine the frequency and patterns of TDIs and their management. The findings are expected to help in the organization and design of educational programs that enhance knowledge about the diagnosis, prevention, and treatment of traumatic dental injuries.

MATERIAL AND METHODS

This retrospective cross-sectional study was approved by the institutional review board at Islamabad Medical & Dental College, as denoted by the reference number IMDC/DS/IRB/236, ensuring compliance with the ethical standards of the Declaration of Helsinki for research involving human subjects. The study focused on patients who had experienced traumatic dental injuries (TDIs) and were treated at the Department of Operative Dentistry, Islamabad Dental Hospital, Pakistan, between the years 2015 and 2022.

The department's archives provided the primary source of data, from which patient records were extracted. These records were based on pre-filled forms specifically designed to document cases of TDIs. Only complete forms were included in the study to ensure the reliability of the data, resulting in a total of 88 teeth being analyzed. The forms contained detailed information including the timing of the injury, the interval between the injury and the patient's arrival at the hospital, and the types of injuries sustained. Hard tissue injuries were classified into subluxation, luxation, intrusion, extrusion, uncomplicated crown fracture, complicated crown fracture, root fracture, and avulsion. Soft tissue injuries were documented as contusion, abrasion, or laceration. The data also included the management approaches undertaken for each case.

The study population was categorized into three age groups: children (1-12 years), adolescents (13-17 years), and adults (18 years and older). Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS), version 23. This involved calculating frequencies and percentages to summarize the data. To explore associations between the type of trauma sustained and demographic variables such as gender and age, the chi-square test was applied, with a significance level set at $p < 0.05$.

These methods provided a structured approach to understanding the patterns and management of traumatic dental injuries within the given population, ensuring that the findings were based on robust and ethically approved data collection and analysis procedures.

RESULTS

The study involved 39 patients with a total of 88 teeth affected by trauma. Of these, 27 were male (69%) and 12 were female (31%), spanning various age groups: 11 children (28%), 4 adolescents (10%), and 24 adults (62%).

Figure 1 illustrates the distribution of different types of traumatic dental injuries (TDIs). The most common injury was a complicated crown fracture, affecting 25 teeth, followed by lateral luxation, uncomplicated crown fracture, root fracture, intrusion, subluxation, avulsion, and alveolar fracture. A chi-square test revealed a significant association between age groups and types of trauma ($p < 0.05$), whereas no significant correlation was found between gender and trauma type ($p = 0.07$).

Treatment for complicated crown fractures typically involved non-surgical root canal treatment, pulpotomy, or apexification, depending on factors such as whether the tooth's apex was open or closed, the time elapsed since the trauma, and the size of the exposure. For the 4 teeth with subluxation and 22 with lateral luxation, treatments included repositioning and splinting. The 15 teeth with uncomplicated crown fractures were repaired using composite build-up and reattachment of any available fractured pieces. For avulsed teeth or those with a poor prognosis, dental implants and bridges were recommended. Table 1 lists the frequency and percentages of the various procedures undertaken.

Table 1 Study Characteristics

| Procedure | Frequency | Percentage (%) |
|----------------------|-----------|----------------|
| Root canal treatment | 26 | 29.5 |
| Composite buildup | 14 | 15.9 |
| Follow up | 2 | 2.3 |
| Splinting | 28 | 31.8 |
| Pulpotomy | 1 | 1.1 |
| Apexification | 2 | 2.3 |

| Procedure | Frequency | Percentage (%) |
|---------------------------------------|-----------|----------------|
| Repositioning and Splinting | 5 | 5.7 |
| Dental implant after extraction (XLA) | 7 | 8.0 |
| No Treatment | 2 | 2.3 |
| Reattachment of fractured tooth | 1 | 1.1 |
| Total | 88 | 100.0 |

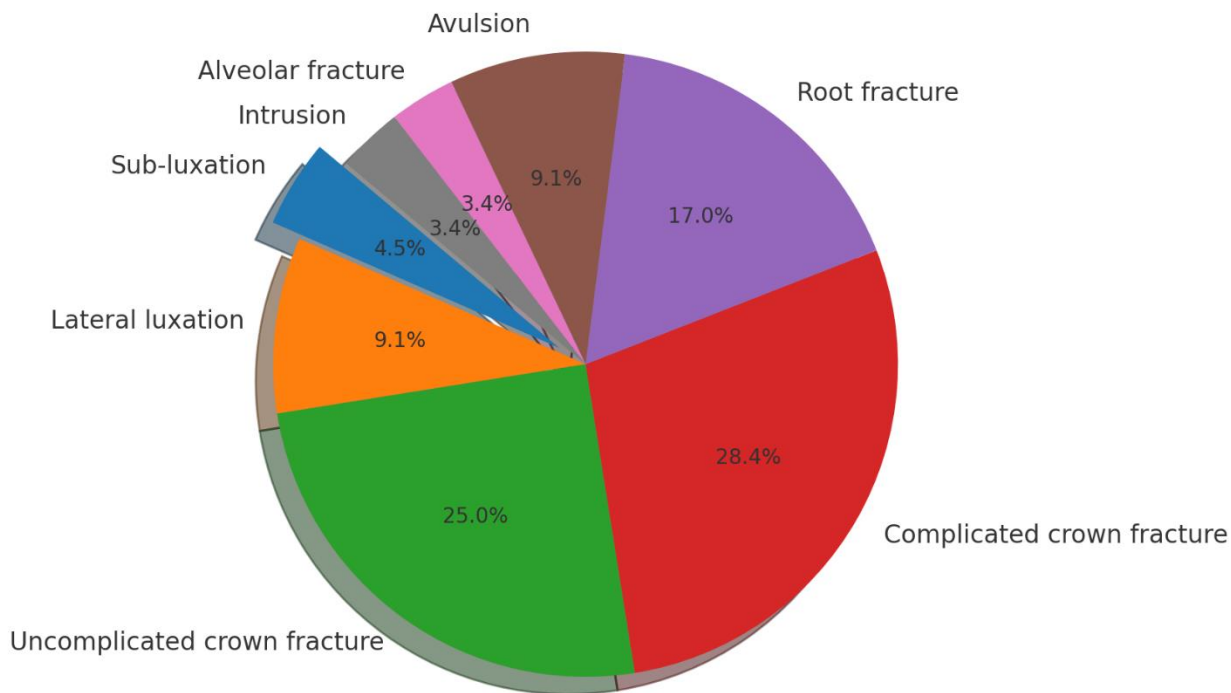


Figure 1 proportion of injury type relative to the total number of case

DISCUSSION

In the context of dental emergencies, traumatic dental injuries (TDIs) frequently necessitate immediate care, with public and private hospitals often being the first points of contact for such cases. The present retrospective study, focused on emergency management of TDIs, was conducted at the Islamabad Dental Hospital’s Department of Operative Dentistry and Endodontics. The analysis revealed a higher incidence of TDIs among males, echoing findings from similar research, where a male predominance was consistently observed (22-24). This gender discrepancy is likely linked to the increased participation of males in contact sports and physically demanding activities.

The study also diverged from the established notion that children and adolescents are the most affected by TDIs due to their engagement in physical activities (5, 25). Contrary to expectations, adults presented with the highest number of trauma cases. This anomaly could be attributed to environmental factors, such as the hospital's proximity to a major highway, leading to a higher incidence of injuries from falls, road traffic accidents, and recreational collisions in adults (5, 26).

Patterns of injuries reported in this study indicated that complicated crown fractures were most frequent, a finding in alignment with other national studies (21) but in contrast to international data where uncomplicated crown fractures are more common (27). This discrepancy could be associated with socio-economic factors prevalent in Pakistan, such as lower literacy rates and limited healthcare accessibility, leading patients to seek treatment only when in pain, which is often the case with more severe injuries like complicated crown fractures (14).

The management of these injuries was conducted in accordance with the most current guidelines, encompassing a range of treatments from reattachment of fractured pieces to dental implants post-extraction (28). These treatments reflect the diverse nature of TDIs and the necessity for a multi-faceted approach to dental trauma care.

However, the study faced several limitations. The data was drawn solely from cases reported during the hospital's working hours, excluding those treated in private clinics or outside regular operating times. Additionally, the outcomes of the treatments provided were not evaluated, presenting a gap in understanding the efficacy of the management strategies employed.

CONCLUSION

In conclusion, the findings reinforce the notion that TDIs represent a significant portion of dental emergencies. The importance of early management in preventing serious consequences cannot be overstated. It is imperative that patients are educated about the criticality of prompt dental care post-injury. Moreover, ongoing training for dentists in the latest dental traumatology guidelines is essential to ensure the provision of effective and immediate treatment. This study underlines the need for comprehensive care models that not only address immediate treatment requirements but also consider the broader socio-economic factors influencing patient behavior regarding dental health.

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